AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (original) An error proofing system for portable tools comprising:

a portable, electrically operated tool for applying torque to set a threaded fastener on a workpiece at a work cell,

said tool having a tool monitor-controller operable for controlling the operation of said tool,

said tool being pre-set to provide an output torque of a desired magnitude,

said tool monitor-controller having a radio frequency tool transceiver for communication with selected devices,

one of said devices being a work cell supervisor located at the work cell to monitor and control said tool,

said work cell supervisor having a radio frequency supervisor transceiver for communicating with said tool through said tool transceiver when said tool is in the work cell,

said tool having a torque sensor for sensing the magnitude of torque applied to each threaded fastener in installation and with the torque magnitude noted in said tool monitor-controller,

said tool providing a torque signal to said work cell supervisor by radio frequency communication between said tool transceiver and said supervisor transceiver when the applied torque of the desired magnitude is reached in setting the threaded fastener

whereby the work cell supervisor can count the number of proper installation torque cycles,

said tool monitor-controller having preset information regarding the desired magnitude of setting torque on said tool and other information as to certain parameters necessary for said tool to be actuated,

said work cell supervisor being preset as to the desired magnitude of setting torque and other information necessary for said tool to be activated and if such information is correct said work cell supervisor will then provide a signal to said monitor-controller by communication between said tool transceiver and said supervisor transceiver to permit said tool to be activated for installing fasteners in the work cell but if the desired magnitude of setting torque is not correct or one of the other parameters is not correct then said tool will not be activated by said work cell supervisor.

2. (original) The error proofing system of claim 1 with said work cell supervisor having a preselected number of torque cycles of desired magnitude required to be produced by the tool on the work piece at the work cell,

said work cell supervisor keeping count of the number of correct torque cycle signals received from said tool monitor-controller of said tool,

if the number of correct torque cycle signals of desired magnitude is attained then said work cell supervisor will permit the workpiece to be transferred from the work cell, if the number is not attained then said work cell supervisor will provide a signal whereby the workpiece can be checked.

3. (original) The error proofing system of claim 1 with said portable electrically actuated tool being battery operated.

4. (original) The error proofing system of claim 1 with said portable electrically actuated tool being powered by connection of an electric cord to a power source at the work cell and including a battery in the tool for energizing said monitor-controller for continuous radio frequency communication by said tool transceiver and with transceivers on other apparatus.

5. (original) The error proofing system of claim 1 with said other parameters including information regarding preselected intervals for recalibration.

6. (original) The error proofing system of claim 1 with said other parameters including information regarding preselected intervals for servicing.

7. (original) The error proofing system of claim 1 with said other parameters including information regarding a preselected number of cycles of installed fasteners for recalibration.

8. (original) The error proofing system of claim 1 with said other parameters including information regarding preselected number of cycles of installed fasteners for servicing.

9. (original) The error proofing system of claim 1 with said other parameters including information regarding a preselected number of elapsed days for recalibration.

10. (original) The error proofing system of claim 1 with said other parameters including information regarding preselected number of elapsed days for servicing.

11. (original) The error proofing system of claim 1 with said devices including a portable audit device having a radio frequency transceiver for

communicating with said tool through said tool transceiver for monitoring certain information in said tool monitor-controller.

12. (original) An error proofing system for portable tools comprising:

a portable, electrically operated tool for applying torque to set a threaded fastener on a workpiece at a work cell,

said tool having a tool monitor-controller operable for controlling the operation of said tool,

said tool being pre-set to provide an output torque of a desired magnitude,

said tool monitor-controller having a radio frequency tool transceiver for communication,

a work cell supervisor located at the work cell to monitor and control said tool and having a radio frequency supervisor transceiver for communicating with said tool through said tool transceiver when said tool is in the work cell,

said tool having a torque sensor for sensing the magnitude of torque applied to each threaded fastener in installation and with the torque magnitude noted in said tool monitor-controller,

said tool providing a torque signal to said work cell supervisor by radio frequency communication between said tool transceiver and said supervisor transceiver when the applied torque of the desired magnitude is reached in setting the threaded fastener whereby the work cell supervisor can count the number of proper installation torque cycles,

said tool monitor-controller having preset information regarding the desired magnitude of setting torque on said tool,

said work cell supervisor being preset as to the desired magnitude of setting torque for said tool to be activated and if such information is correct said work cell supervisor will then provide a signal to said monitor-controller by communication between said tool transceiver and said supervisor transceiver to permit said tool to be activated for installing fasteners in the work cell but if the desired magnitude of setting torque is not correct then said tool will not be activated by said work cell supervisor.

13. (original) The error proofing system of claim 12 with said work cell supervisor having a preselected number of torque cycles of desired magnitude required to be produced by the tool on the work piece at the work cell,

said work cell supervisor keeping count of the number of correct torque cycle signals received from said tool monitor-controller of said tool,

if the number of correct torque cycle signals of desired magnitude is attained then said work cell supervisor will permit the workpiece to be transferred from the work cell, if the number is not attained then said work cell supervisor will provide a signal whereby the workpiece can be checked.

14. (original) The error proofing system of claim 12 with said portable electrically actuated tool being battery operated.

15. (original) The error proofing system of claim 12 with said portable electrically actuated tool being powered by connection of an electric cord to a power source at the work cell and including a battery in the tool for energizing said monitor-controller for continuous radio frequency communication by said tool transceiver with transceivers on other apparatus.

16. (currently amended) The error proofing system of claim 12 with said ~~other parameters~~tool monitor-controller including information regarding preselected intervals for recalibration, said work cell supervisor receiving such information and providing a signal to alert for recalibration by or at the selected interval.

17. (currently amended) The error proofing system of claim 12 with said ~~other parameters~~ tool monitor-controller including information regarding preselected intervals for servicing, said work cell supervisor receiving such information and providing a signal to alert for servicing by or at the selected interval.

18. (currently amended) The error proofing system of claim 12 with said ~~other parameters~~tool monitor-controller including information regarding a preselected number of cycles of installed fasteners for recalibration, said work cell supervisor receiving such information and providing a signal to alert for recalibration by or at the preselected number of cycles.

19. (currently amended) The error proofing system of claim 12 with said ~~other parameters~~tool monitor-controller including information regarding a preselected number of cycles of installed fasteners for servicing, said work cell supervisor receiving such information and providing a signal to alert for servicing by or at the preselected number of cycles.

20. (currently amended) The error proofing system of claim 12 with said ~~other parameters~~tool monitor-controller including information regarding a preselected number of elapsed days for recalibration, said work cell supervisor receiving such information and providing a signal to alert for recalibration by or at the preselected number of elapsed days.

21. (currently amended) The error proofing system of claim 12 with said ~~other parameters~~tool monitor-controller including information regarding a preselected number of elapsed days for servicing, said work cell supervisor receiving such information and providing a signal to alert for servicing by or at the preselected number of elapsed days.

22. (currently amended) The error proofing system of claim 12 with said devices including a portable audit device having a radio frequency transceiver for communicating with said tool through said tool transceiver for monitoring certain information in said tool monitor-controller, such communication occurring outside of the range of said supervisor transceiver.

23. (currently amended)An error proofing system for portable tools comprising:

a portable, electrically operated tool for applying torque to set a threaded fastener on a workpiece at a work cell,

said tool having a tool monitor-controller operable for controlling the operation of said tool,

said tool being pre-set to provide an output torque of a desired magnitude,

said tool monitor-controller having a radio frequency tool transceiver for communication,

a work cell supervisor located at the work cell to monitor and control said tool and having a radio frequency supervisor transceiver for communicating with said tool through said tool transceiver when said tool is in the work cell,

said tool having a torque sensor for sensing the magnitude of torque applied to each threaded fastener in installation and with the torque magnitude noted in said tool monitor-controller,

said tool monitor-controller having preset information regarding the desired magnitude of setting torque on said tool,

said work cell supervisor being preset as to the desired magnitude of setting torque for said tool to be activated and if the magnitude of setting torque is correct said work cell supervisor will then provide a signal to said monitor-controller by communication between said tool transceiver and said supervisor transceiver to permit said tool to be activated for installing fasteners in the work cell but if the desired magnitude of setting torque is not correct then said tool will not be activated by said work cell supervisor.

24. (original) The error proofing system of claim 23 with said portable tool being activated only when in the radio frequency range of said work cell supervisor or other device having a radio frequency transceiver communicable with said radio frequency tool transceiver to selectively provide a signal activating said portable tool, said portable tool being deactivated and not otherwise actuable when out of the range of said radio frequency transceivers of said work cell supervisor or other of said devices whereby theft of said portable tool is inhibited.

25. (original) The error proofing system of claim 24 with said radio frequency of said tool being continuously actuated to provide the radio frequency signal whereby a monitor at the location of said portable tool can detect the presence of said tool at exit areas whereby theft of said portable tool is inhibited.

26. (original) An error proofing system for portable tools comprising:

a portable tool for performing a preselected task on a workpiece at a work cell,

said tool having a tool monitor-controller operable for controlling the operation of said tool,

said tool being pre-set to provide the task at a desired magnitude,

said tool monitor-controller having a radio frequency tool transceiver for communication with selected devices,

one of said devices being a work cell supervisor located at the work cell to monitor and control said tool,

said work cell supervisor having a radio frequency supervisor transceiver for communicating with said tool through said tool transceiver when said tool is in the work cell,

said tool having a sensor for sensing the magnitude of the task applied to the workpiece,

said tool providing a task magnitude signal to said work cell supervisor by radio frequency communication between said tool transceiver and said supervisor transceiver when the applied task of the desired magnitude is reached whereby the work cell supervisor can monitor the operation of said tool,

said tool monitor-controller having preset information regarding the desired magnitude of the setting of the task on said tool and other information as to certain parameters necessary for said tool to be actuated,

said work cell supervisor being preset as to the desired magnitude of the task and other information necessary for said tool to be activated and if such information is

correct said work cell supervisor will then provide a signal to said monitor-controller by communication between said tool transceiver and said supervisor transceiver to permit said tool to be activated to perform task in the work cell but if the desired magnitude of the task is not correct or one of the other parameters is not correct then a signal will be generated whereby said tool should not be activated.

27. (original) An error proofing system for portable tools comprising:

a portable, electrically operated tool for applying torque to set a threaded fastener on a workpiece at a work cell,

said tool having a tool monitor-controller operable for controlling the operation of said tool,

said tool being pre-set to provide an output torque of a desired magnitude,

said tool monitor-controller having a radio frequency tool transceiver for communication,

a work cell supervisor located at the work cell to monitor and control said tool and having a radio frequency supervisor transceiver for communicating with said tool through said tool transceiver when said tool is in the work cell,

said tool having a torque sensor for sensing the magnitude of torque applied to each threaded fastener in installation and with the torque magnitude noted in said tool monitor-controller,

said tool providing a torque signal to said work cell supervisor by radio frequency communication between said tool transceiver and said supervisor transceiver when the applied torque of the desired magnitude is reached in setting the threaded fastener

whereby the work cell supervisor can count the number of proper installation torque cycles,

said tool monitor-controller having preset information regarding the desired magnitude of setting torque on said tool,

said work cell supervisor being preset as to the desired magnitude of setting torque for said tool to be activated and if such information is correct said work cell supervisor will then provide a signal to said monitor-controller by communication between said tool transceiver and said supervisor transceiver to permit said tool to be activated for installing fasteners in the work cell but if the desired magnitude of setting torque is not correct then said tool will not be activated by said work cell supervisor,

said work cell supervisor capable of activating said tool by R-F communication with said tool monitor-controller to permit said tool to be activated to install fasteners outside of the R-F range of said supervisor transceiver for a preselected interval.

28. (new) The error proofing system of claim 27 with said preselected interval when said tool is activated to install fasteners outside of the R-F range of said supervisor transceiver being a preselected number of cycles of applied torque of the desired magnitude as counted by said tool monitor-controller.

29. (new) The error proofing system of claim 1 with said tool monitor-controller having preset information as to certain parameters which cannot be changed by the end user or in the field and includes at least one of the following: tool type, tool serial number or tool build date.

30. (new) The error proofing system of claim 1 including a calibration station for calibrating said tool to said desired magnitude of output torque and having a radio

frequency calibration transceiver for communicating with said tool monitor-controller through said radio frequency tool transceiver for providing said tool monitor-controller with said preset information regarding said magnitude of setting torque as set at said calibration station.

31. (new) The error proofing system of claim 1 with said tool monitor-controller including a printed circuit board and software and including restricted access means requiring a preselected password for changing information in said tool monitor-controller relating to one or more of revision to said printed circuit board or circuit board serial number, software revision, tool maximum capacity or tool minimum capacity.

32. (new) The error proofing system of claim 1 including a calibration station for calibrating said tool to said desired magnitude of output torque and having a radio frequency calibration transceiver for communicating with said tool monitor-controller through said radio frequency tool transceiver for providing said tool monitor-controller with said preset information regarding said magnitude of setting torque as set at said calibration station, said tool monitor-controller including a printed circuit board and software and with said calibration station including restricted access means requiring a preselected password for changing information in said tool monitor-controller relating to one or more of revisions to said printed circuit board or circuit board serial number, software revision, tool maximum capacity or tool minimum capacity.

33. (new) The error proofing system of claim 1 with said tool monitor-controller including at least one open memory location to permit the end user to insert selected information in such memory location.

34. (new) The error proofing system of claim 1 with said work cell supervisor having means selectively operable by an operator for resetting the recorded cycle count of the number of correct torque magnitude to zero.

35. (new) The error proofing system of claim 1 with said work cell supervisor having means selectively operable by an operator for incrementally reducing the recorded cycle count of the number of cycles of correct magnitude.

36. (new) The error proofing system of claim 1 with said work cell supervisor including control means selectively actuable by an operator to permit said tool to be operated substantially without restriction within said work cell but with said control means including restricted access means to selectively limit access to said control means.

37. (new) The error proofing system of claim 1 with said devices including a portable audit device having a radio frequency transceiver for communicating with said tool through said tool transceiver for monitoring certain information in said tool monitor-controller, such communication occurring outside of the range of said supervisor transceiver.

38. (new) The error proofing system of claim 1 with said other information in said tool monitor-controller as to certain parameters including information as to the make and/or model number of said tool,

said work cell supervisor being preset as to information as to the desired make and/or model number of said tool to be operable at the work cell and if such information from said tool monitor-controller is not correct then said tool will not be actuated by said work cell supervisor.

39. (new) The error proofing system of claim 1 with said tool monitor-controller having a memory for numerous fields including total tool cycle count, data as to last service and last calibration, said work cell supervisor recording the total number of cycles performed by said tool while in the work cell and periodically updating the total tool cycle count in a memory of said tool monitor-controller after a preselected number of cycles.

40. (new) The error proofing system of claim 1 with said other parameters including information regarding identification of said tool, information for periodic servicing of said tool, and information for periodic calibration of said tool.

41. (new) The error proofing system of claim 40 with said noted information being accessible by said work cell supervisor by radio frequency communication.

42. (new) The error proofing system of claim 40 including a calibration station for calibrating said tool to said desired magnitude of output torque and having a radio frequency calibration transceiver for communicating with said tool monitor-controller through said radio frequency tool transceiver for providing said tool monitor-controller with said preset information regarding said magnitude of setting torque as set at said calibration station and with said noted information being accessible by said calibration station by radio frequency communication.

43. (new) The error proofing system of claim 12 with said tool monitor-controller having preset conformation as to other parameters including information regarding identification of said tool, information for periodic servicing of said tool, and information for periodic calibration of said tool.

44. (new) The error proofing system of claim 43 with said noted information being accessible by said work cell supervisor by radio frequency communication.

45. (new) The error proofing system of claim 43 including a calibration station for calibrating said tool to said desired magnitude of output torque and having a radio frequency calibration transceiver for communicating with said tool monitor-controller through said radio frequency tool transceiver for providing said tool monitor-controller with said preset information regarding said magnitude of setting torque as set at said calibration station and with said noted information being accessible by said calibration station by radio frequency communication.